

FIG. 1a

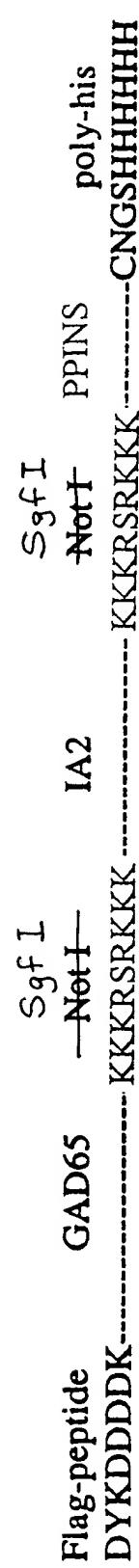


FIG. 1b

—IA2— Undetermined aa 771-979 — Accession No. L18983

MRRPRPGGGGLRLCLLSSRPGGCSAVSAHGCFLDRRLCSHLLEVCIQDGLFGQQCQVGVGQARPLQQTSPVILQRL
QGVLRQLMSQGLSWHDLLTQYVISQEMERIPRLRPPRPRDRSGLAPKRPGPAGEIILQDIPTGSAPAQQHRLPQQPVGG
AGASSSLSPQAELLPPLEHLLPPIEQLPPLQSYEPALLQYQPLFHQFGSRDGSRVSEGSPGMIVSVGPLPKAEAPALFSRTASKGI
FGDHPGHSYGDLPGPSPAQLFQDSGLLYLAQELPAPSRAARVPRLLPEQGSSSRAEDSPEGYEKEGLGDRGEKPASPAVQPDAAI
ORLAAVLAGYGVELRQLTPEQLSTLTLQQLPKGAGRNPQGGVVNVGADIKKTMEGPVEGRDTAELPARTSPMPGHPTASPT
SSEVQQVPSVSSEPPKAARPVTPVILEKKSPPLQ-SQOPTVAGQPSARPAEEYGYIVTDQPKPLSLAAGVKLLEILAEHVHMSS
GSFNISVVGPAITFRIRHNEQNLSLADVTQQAGLVKSELEAQTGLQILQTGVGQREAAAIVLPQTAHSTSPMRSVLLTLVALA
GVAGLLVALAVALCVRQHARQQDKERLAALGPEGAHGDTTFEYQDLLCRQHMATKSLFNRAEGPPEPSRSSVSSQFSDAAQ
ASPSHSSTSWSCEPAQANMDISTGHMILAYMEDHLRNDRRLAKEWQALCAYQAEPNTCATAQGEIGNIKKNRHPDFLPYDH
ARIKLKVESSPSRSYINASPIEHDPRMPAYIAJOGPLSLHTIADEFWQMWWESGCTIVMLTPLVEDGVKOCDRYWPDEGASY
HVEVNVLVSEHIWCEDFLVRSFYLKNVQTOETRTLTOFHFLSWPAEGTPASTRPLLDFRRKVNKCYRGRCSCPIVHCSDGAGR
IGTYLIDMVLNRMMAKGVKEIDIAATLEHVRDORPGLVRSKDOFEFALTAVAEEVNAILKALPO

FIG. 2a

GAD65—Undetermined aa 02-585—Accession No. M74826

MASPGSGFWSEDGSGDSENPGTARAWCQVAQKFTGGIGNKLCALLYGDAEKPAESGSQPPRAAARKAACACDQKPCS
CSKVDVNYAFLHATDLLPACDGERPTLAFLQDVNNILLQYYVKSFDRTSKVIDFHYPNELLOEYNWELADQOPONLEILMHIC
OTLKYAIKTKGHPRYFNOLSTGLDMVGLAADWLTSANTTNMFTEYELAPVFVLLYYTLLKKMREIIGWPGGSGDGIFSPGGAIS
NMYAMMMIARFKMIFPEVKKGMAALPRIJAFTSEHSHFSLKKGAAALGIGTDSVILIKCDERGMIMPSDLERRILEAKOKGFVPF
LVSATAGTIVYGAFFDPLLAVIDICKYKIWMHVDAAWGGGLLMSRKHKWKLSGVVERANSVTWNPHKMMGVPLQCSALLY
REEGLMONCNOMHASYLFQODKHYDLSYDTGDKALOCGRHVDFEKLWLMWRAKGTTGEEAHVDKCLEAEYLYNIKNR
EGYEMVFDGKPOHTNVCFWYIPPSLRTLEDNEERMSRSLSKVAVPIKARMMEYGTIMSYOPLGDKVNFRMVISNPAATHQ
DIDFLIEEERLGODL

Translation Human preproinsulin

FIG. 2b

MALWMRLLPLALLALWGPDPAAAFVNQHLCGSHLVEALYLVCCERGFFYT
PKTRREAEDLQVGGQVELGGGGAGSLQPLALEGSLSQKRGIVEQCCTSICSLYQ
LENYCN

FIG. 2c

Human GAD₆₇ nucleotide sequenceM74826 Length: 2457 September 1, 1995 12:22 Type: N Check: 8038 ..

1 ACCCGCCCTC GCCGCTCGGC CCCGCGCGTC CCCGCGCGTG CCCTCCTCCC
51 GCCACACGGC ACGCACGCGC GCGCAGGGCC AAGCCGAGGC AGCCGCCCGC
101 AGCTCGCACT CGCTGGCGAC CTGCTCCAGT CTCCAAAGCC GATGGCATCT
151 CCGGGCTCTG GCTTTGGTC TTTGGGTG GAAGATGGCT CTGGGGATTG
201 CGAGAATCCC GGCACAGCGC GAGCCTGGTG CCAAGTGGCT CAGAAGTTCA
251 CGGGCGGCAT CGGAAACAAA CTGTGCGCCC TGCTCTACGG AGACGCCGAG
301 AAGCCGGCGG AGAGCGGCGG GAGCCAACCC CCGCGGGCCG CCGCCCGGAA
351 GGCGCCTGC GCCTGCGACC AGAACCCCTG CAGCTGCTCC AAAGTGGATG
401 TCAACTACGC GTTTCTCCAT GCAACAGACC TGCTGCCGGC GTGTGATGGA
451 GAAAGGCCCA CTTTGGCGTT TCTGCAAGAT GTTATGAACA TTTTACTTCA
501 GTATGTGGTG AAAAGTTCG ATAGATCAAC CAAAGTGATT GATTCCATT
551 ATCCTAATGA GCTTCTCAA GAATATAATT GGGATTGGC AGACCAACCA
601 CAAAATTGG AGGAAATTIT GATGCATTGC CAAACAACTC TAAAATATGC
651 AATTAAAACA GGGCATCCTA GATACTCAA TCAACTITCT ACTGGTTGG
701 ATATGGTTGG ATTAGCAGCA GACTGGCTGA CATCAACAGC AAATACTAAC
751 ATGTTCACCT ATGAAATTGC TCCAGTATT GTGCTTTGG AATATGTCAC
801 ACTAAAGAAA ATGAGAGAAA TCATTGGCTG GCCAGGGGGC TCTGGCGATG
851 GGATATTTTC TCCCGGTGGC GCCATATCTA ACATGTATGC CATGATGATC
901 GCACGCTITA AGATGTTCCC AGAAGTCAAG GAGAAAGGAA TGGCTGCTCT
951 TCCCAGGCTC ATTGCCTTCA CGTCTGAACA TAGTCATT TCTCTCAAGA
1001 AGGGAGCTGC AGCCTTAGGG ATTGGAACAG ACAGCGTGAT TCTGATTAAA
1051 TGTGATGAGA GAGGGAAAAT GATTCCATCT GATCTTGAAA GAAGGATTCT
1101 TGAAGCCAAA CAGAAAGGGT TTGTTCCCTT CCTCGTGAGT GCCACAGCTG
1151 GAACCACCGT GTACGGAGCA TTTGACCCCC TCTTAGCTGT CGCTGACATT
1201 TGCAAAAAGT ATAAGATCTG GATGCATGTG GATGCAGCTT GGGGTGGGG
1251 ATTACTGATG TCCCGAAAAC ACAAGTGGAA ACTGAGTGGC GTGGAGAGGG

FIG. 3a

~~Human IA-2 nucleotide sequence~~

~~L18983 Length: 3613 November 20, 1997 16:45 Type: N Check: 6409 ..~~

1 CAGCCCCCTCT GGCAGGCTCC CGCCAGCGTC GCTGCGGCTC CGGCCCGGGAA
51 GCGAGCGCCC GGAGCTCGGA AAGATGCGGC GCCCGCGGCG GCCTGGGGGT
101 CTCGGGGGAT CCGGGGGTCT CCGGCTGCTC CTCTGCCTCC TGCTGCTGAG
151 CAGCCGCCCG GGGGGCTGCA GCGCCGTTAG TGCCCACGGC TGTCTATTG
201 ACCGCAGGCT CTGCTCTCAC CTGGAAGTCT GTATTCAAGGA TGGCTTGTTT
251 GGGCAGTGCC AGGTGGGAGT GGGGCAGGCC CGGCCCTTT TGCAAGTCAC
301 CTCCCCAGTT CTCCAACGCT TACAAGGTGT GCTCCGACAA CTCATGTCCC
351 AAGGATTGTC CTGGCACGAT GACCTCACCC AGTATGTGAT CTCTCAGGAG
401 ATGGAGCGCA TCCCCAGGCT TCGCCCCCA GAGCCCCGTC CAAGGGACAG
451 GTCTGGCTTG GCACCCAAGA GACCTGGTCC TGCTGGAGAG CTGCTTTAC
501 AGGACATCCC CACTGGCTCC GCCCCTGCTG CCCAGCATCG GCTTCCACAA
551 CCACCAGTGG GCAAAGGTGG AGCTGGGCC AGCTCCTCTC TGCTCCCTCT
601 GCAGGCTGAG CTGCTCCCGC CTCTCTTGGA GCACCTGCTG CTGCCCCCAC
651 AGCCTCCCCA CCCTTCACTG AGTTACGAAC CTGCCTTGCT GCAGCCCTAC
701 CTGTTCCACC AGTTGGCTC CCGTGATGGC TCCAGGGTCT CAGAGGGCTC
751 CCCAGGGATG GTCAGTGTCTG GCCCCCTGCC CAAGGCTGAA GCCCCTGCC
801 TCTTCAGCAG AACTGCCTCC AAGGGCATAT TTGGGGACCA CCCTGGCCAC
851 TCCTACGGGG ACCTTCCAGG GCCTTCACCT GCCCAGCTT TTCAAGACTC
901 TGGGCTGCTC TATCTGGCCC AGGAGTTGCC AGCACCCAGC AGGGCCAGGG
951 TGCCAAGGCT GCCAGAGCAA GGGAGCAGCA GCCGGGCAGA GGACTCCCCA
1001 GAGGGCTATG AGAAGGAAGG ACTAGGGAT CGTGGAGAGA AGCCTGCTTC
1051 CCCAGCTGTG CAGCCAGATG CGGCTCTGCA GAGGCTGGCC GCTGTGCTGG
1101 CGGGCTATGG GGTAGAGCTG CGTCAGCTGA CCCCTGAGCA GCTCTCCACA
1151 CTCCTGACCC TGCTGCAGCT ACTGCCAAG GGTGCAGGAA GAAATCCGGG
1201 AGGGGTTGTA AATGTTGGAG CTGATATCAA GAAAACAATG GAGGGGCCGG
1251 TGGAGGGCAG AGACACAGCA GAGCTTCCAG CCCGCACATC CCCCATGCCT

PREPROINSULIN

Exon sequences, i.e. sequences to be used in the patent are underlined and represent exon sequences.

V00565 Length: 4992 December 18, 1997 17:50 Type: N Check: 9721

1 CTCGAGGGGC CTAGACATTG CCCTCCAGAG AGAGCACCCA ACACCCTCCA
51 GGCTTGACCG GCCAGGGTGT CCCCTTCCTA CCTTGGAGAG AGCAGCCCCA
101 GGGCATCCTG CAGGGGGTGC TGGGACACCA GCTGGCCTTC AAGGTCTCTG
151 CCTCCCTCCA GCCACCCCAC TACACGCTGC TGGGATCCTG GATCTCAGCT
201 CCCTGGCCGA CAACACTGGC AAACCTCTAC TCATCCACGA AGGCCCTCCT
251 GGGCATGGTG GTCTTCCCA GCCTGGCAGT CTGTTCTCA CACACCTTGT
301 TAGTGCCAG CCCCTGAGGT TGCAAGCTGGG GGTGTCTCTG AAGGGCTGTG
351 AGCCCCCAGG AAGCCCTGGG GAAGTGCCTG CCTTGCCTCC CCCCCGGCCCT
401 GCCAGCGCCT GGCTCTGCC TCCTACCTGG GCTCCCCCA TCCAGCCTCC
451 CTCCCTACAC ACTCCTCTCA AGGAGGCACC CATGTCTCT CCAGCTGCCG
501 GGCTCAGAG CACTGTGGCG TCCTGGGCA GCCACCGCAT GTCTGCTGT
551 GGCATGGCTC AGGGTGGAAA GGGCGGAAGG GAGGGGTCT GCAGATAGCT
601 GGTGCCACT ACCAAACCCG CTCGGGCAG GAGAGCCAAA GGCTGGGTGT
651 GTGCAGAGCG GCCCCGAGAG GTTCCGAGGC TGAGGCCAGG GTGGGACATA
701 GGGATGCGAG GGGCCGGGGC ACAGGATACT CCAACCTGCC TGCCCCATG
751 GTCTCATCCT CCTGCTCTG GGACCTCCTG ATCCTGCCCT TGGTGCTAAG
801 AGGCAGGTAA GGGCTGCAG GCAGCAGGGC TCGGAGCCCA TGCCCCCTCA
851 CCATGGGTCA GGCTGGACCT CCAGGTGCCT GTTCTGGGA GCTGGGAGGG
901 CCGGAGGGGT GTACCCCAGG GGCTCAGCCC AGATGACACT ATGGGGGTGA
951 TGGTGTATG GGACCTGGCC AGGAGAGGGG AGATGGGCTC CCAGAACAGG
1001 AGTGGGGCT GAGAGGGTGC CTGGGGGCC AGGACGGAGC TGGGCCAGTG
1051 CACAGCTTCC CACACCTGCC CACCCCCAGA GTCCTGCCGC CACCCCCAGA
1101 TCACACGGAA GATGAGGTCC GAGTGGCCTG CTGAGGACTT GCTGCTTGT
1151 CCCAGGTCCC CAGGTATGC CCTCCTCTG CCACCTGGG GAGCTGAGGG
1201 CCTCAGCTGG GGCTGCTGTC CTAAGGCAGG GTGGGAACCA GGCAGCCAGC
1251 AGGGAGGGGA CCCCTCCCTC ACTCCCACTC TCCCACCCCC ACCACCTTGG
1301 CCCATCCATG GCGGCATCTT GGGCCATCCG GGACTGGGA CAGGGGTCT
1351 GGGGACAGGG GTCCGGGGAC AGGGTCCTGG GGACAGGGGT GTGGGGACAG